Outcomes and objectives

**Outcome 1: Appropriate pathways for uptake and delivery of SI innovations, to inform the inclusive design and scaling programming that will lessen hunger and poverty under conditions of climate change**

Reduction of household and community vulnerability to ever-increasing uncertainty in the onset and volume of rain and in-season droughts is needed for these groups to become more resilient and adaptive. Small-scale irrigation has the potential to buffer households and communities from overdependence on rainfed production systems, and provide off-season food and nutritional security, and create income-earning opportunities. Supplemental irrigation especially of leafy vegetables potentially provides opportunities for women and youth. Elite vegetable varieties have been evaluated and adopted by several beneficiaries under rain-fed conditions. Introducing off-season supplemental irrigation can result in even higher incomes. While there are technologies on supplemental irrigation, little or no effort has been made to transfer these to farmers in many regions. Under Phase I, a number of SI innovations were developed at project sites. In the second Phase, there is need to assess the opportunities and constraints/feasibility beyond the tested sites that meet sustainable and equity criteria. The specific objectives under this outcome set out to build on existing practices to incorporate new approaches to providing water for crop and livestock during dry periods of the year include:

Objective 1.1. Test opportunities and constraints for supplementary irrigation in rain-fed mixed farming systems to reduce vulnerability to weather variability and improve livelihoods

Objective 1.2. To enhance soil and water resources in order to meet food, feeds and nutrition needs in sustainable and equitable manner

Outcome 2: Options for equitable food and feed safety and nutritional quality of target smallholder families improved

Traditional food production and consumption can be lacking in diversity and this is reflected in poor nutrition in selected elements of households and communities (e.g., stunting, wasting in children). This outcome sets out to address how more nutritious food can be produced and consumed in a more equitable manner (intra-household and community). Researchers have already developed enriched crop and feed varieties with high potential to address some nutritional challenges some of which have already been introduced in the AR sites. In terms of food safety, post-harvest management of cereal grain and crop residues are often associated with high losses through spoilage by pests and diseases (Abass et al. xx). Attacks on crop and harvest products by pathogens result in food and feed contamination such as by aflatoxins. This outcome targets to address contamination through generating evidence of drivers, risks and solutions. Superior options for mitigating aflatoxins and other hazards in fresh foods need to be scaled up to reach wider communities. In AR Phase I, activities for promotion of nutritional education were undertaken but very little was done on behavioral change communication e.g., promotion of recipe development. Under this outcome, there are three specific objectives that relate to crop and food diversity,….

**Objective** 1.1 To investigate production and consumption drivers of diverse crop and fodder varieties to improve food, feed and nutrition status at household members

**Objective** 2.1 To investigate the drivers of equitable adoption of post-harvest technologies to improve food/feed supply for different typologies

**Objective** 3.1 To investigate acceptability and utilization options for enriched crop varieties and livestock feed resources.

**Objective** 3.2 To test production options for enhancing food safety while maintaining nutritional quality in different agro-ecological context of the target countries

**Outcome 3: Smallholder families adopt technology packages that improve food, nutrition and income security**

A key element of Phase II is to scale up already validated technological packages developed in Phase I in collaboration with development partners. Low adoption of technological packages presents a key to scientists and development practitioners. Working with development partners will significantly increase the opportunity to successful adoption of technologies. Delivery mechanisms remain unclear and in this program, the effectiveness of different dissemination approaches will be evaluated using modelling and geo-spatial analyses and other techniques. Farmers need information related to risks and existing opportunities to make informed decisions on technology adoption. An important part of this outcome is to use typologies (biophysical and socio-economic) developed under AR phase I. the specific objectives under this outcome are:

**Objective 3.1** To identify and deploy efficient gender sensitive pathways/networks and approaches for delivery of validated technologies for adoption across different biophysical and socio-economic contexts.

**Objective 3.2** To enhance learning among scaling actors for necessary adaptation across the delivery pathways

**Outcome 4: Improved functionality of markets, institutions and partnerships associated with SI technology through provision of mechanisms that improve household linkages to markets**

Under AR Phase I, emphasis was on development of technological packages and it is needed to link farmers to functional markets. Individual farmers are not competitive in the market because of low volumes of produce (low bargaining power and inability to meet quality standards for high value markets). In Phase II, more emphasis will be in providing functional market information and support systems through collective action. In addition, best bet/ inclusive business models that would provide better market access to small holder families. Further, majority of farmers lack knowledge in recognizing farmers as a business. Specific attention will be given to the opportunities for gender-transformative approaches to markets. Modern developments and penetration of ICT even in remote areas provides an enormous important opportunity (vehicle) for strengthening existing market linkages and creating new ones. Research on value chain upgrading strategies that maximize net benefits to all farm families and other actors will be undertaken. The specific objectives under this outcome include:

**Objective 4.1** To enhance the involvement of market stakeholders in technology development processes.

**Objective 4.1** To assess how farmers understand markets and how this translates into production.

**Objective 4.1** To improve market efficiency through collective action.

**Objective 4.1** To assess to what extent and in which contexts gender transformative approaches can result in more equitable benefits from sustainable intensification.

**Outcome 5: Enhanced productivity of crop and livestock systems in selected semi-arid and humid agro-ecologies of ESA**

Underpinning SI is the need to increase productivity per unit of input. This outcome will address options for optimum integrated crop-livestock approaches that will increase diversity and allocative efficiencies in farm households. Previous research has not given appropriate attention to the interactions and trade-offs between crop and livestock components at household, community and landscape scales whilst maintaining natural resource capital (soil and water). Particular attention will be given to options that reduce drudgery and improve efficiency in a gender-sensitive manner. The specific objectives under this outcome are:

Objective 5.1 To refine and test scalable integrated crop-livestock technologies that equitably optimize productivity for specific agro ecologies

Objective 5.2 To develop functional linkages between crop livestock enterprises that ensure increased availability of diverse crop and livestock products for consumption and income.

Objective 5.3 To adapt and disseminate cost effective, labour saving and gender sensitive technologies